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Brief Report

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Ramipril and the Development of Diabetes

Salim Yusuf, DPhil,FRCP; Hertzl Gerstein, FRCP; Byron Hoogwerf, MD;
Janice Pogue, MSc; Jackie Bosch, MSc; Bruce H. R. Wolffenbuttel, MD;
Bernard Zinman, FRCP; for the HOPE Study Investigators

JAMA. 2001;286:1882-1885.

Context Type 2 diabetes is a growing clinical and public health problem. Preventive efforts related to lifestyle modification are not always successful; therefore, alternative prevention strategies need to be studied.

Objective To investigate the effectiveness of ramipril, an angiotensin-converting enzyme inhibitor, in preventing diabetes among high-risk persons.

Design, Setting, and Participants The randomized, controlled Heart Outcomes Prevention Evaluation trial of 5720 patients older than 55 years without known diabetes but with vascular disease who were followed up for a mean of 4.5 years. The study included 267 hospitals in 19 countries and was conducted between 1994 and 1999.

Intervention Patients were randomly assigned to receive ramipril, up to 10 mg/d (n = 2837), or placebo (n = 2883).

Main Outcome Measure Diagnosis of diabetes determined from self-report at follow-up visits months, compared between the 2 groups.

Results One hundred and two individuals (3.6%) in the ramipril group developed diabetes compared with 155 (5.4%) in the placebo group (relative risk [RR], 0.66; 95% confidence interval [CI], 0.51-0.85; $P < .001$). Similar results were noted when different diagnostic criteria were used; in the ramipril group, the RR for diagnosis of diabetes and hemoglobin A_{1c} greater than 11.0% was 0.60 (95% CI, 0.43-0.83), for initiation of glucose-lowering therapy, 0.56 (95% CI, 0.41-0.77), and for both, 0.51 (95% CI, 0.37-0.70). These effects were also consistently seen in several subgroups examined.

Conclusions Ramipril is associated with lower rates of new diagnosis of diabetes in high-risk individuals. Because these results have important clinical and public health implications, this hypothesis requires prospective confirmation.

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